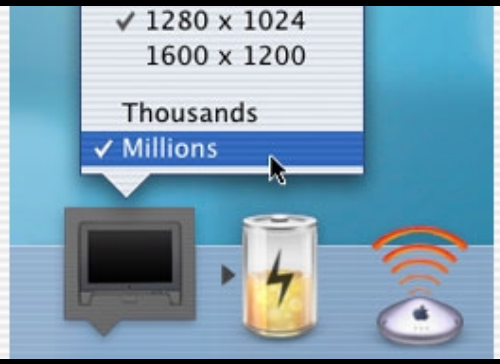
Session 604

Introduction to Enterprise Objects Framework



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Introduction

- An introduction to the Enterprise Objects Framework (EOF)

What You'll Learn

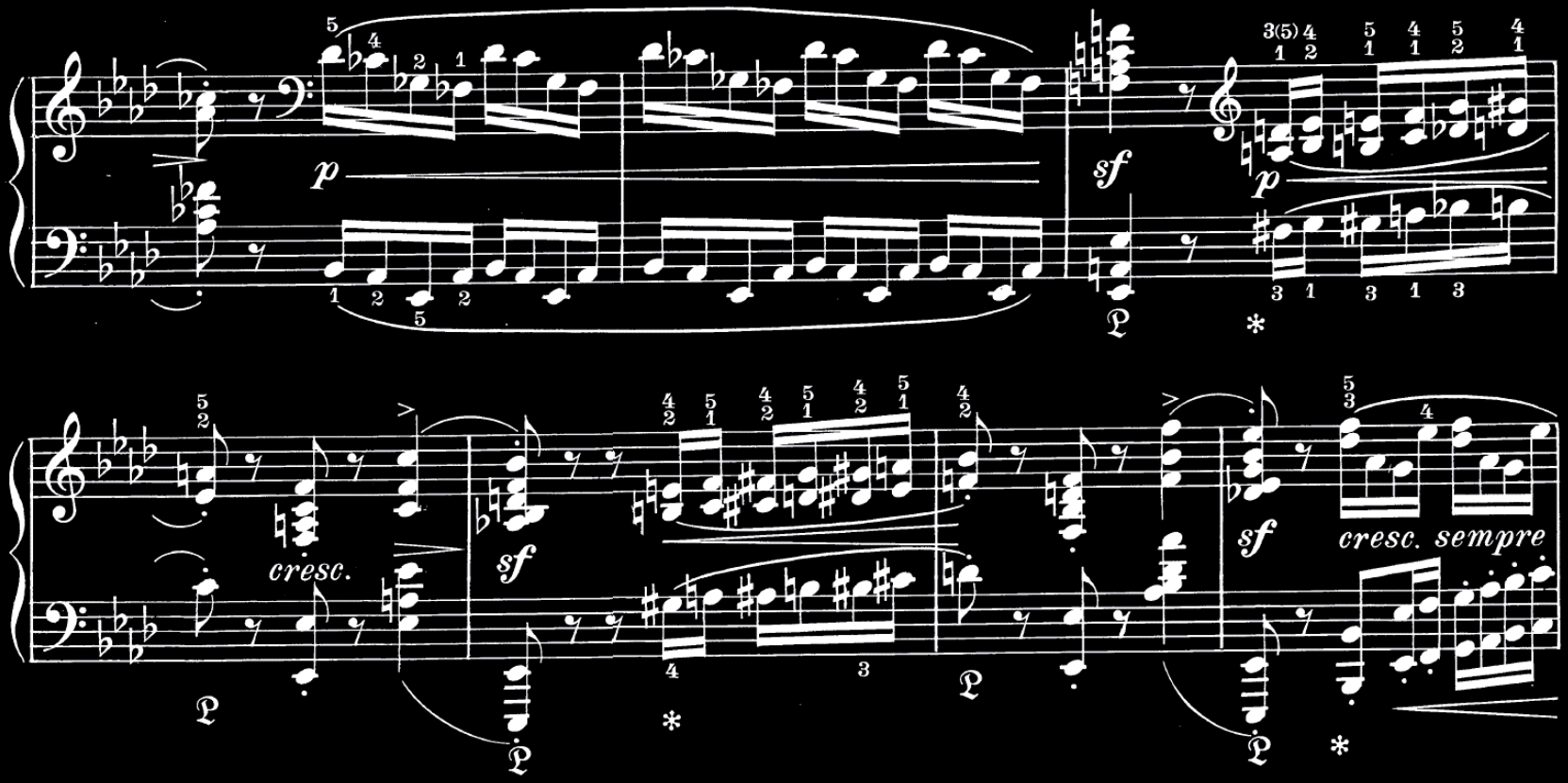
- An overview of the purpose of EOF
- A conceptual model of how EOF works
- Practical code for basic database CRUD
  - Create
  - Retrieve
  - Update
  - Delete

Technology Framework

- An introduction to the EOAccess and EOControl frameworks of EOF
- These frameworks form the core of database access in:
  - HTML-based WebObjects applications
  - Cocoa applications
  - Java Client applications

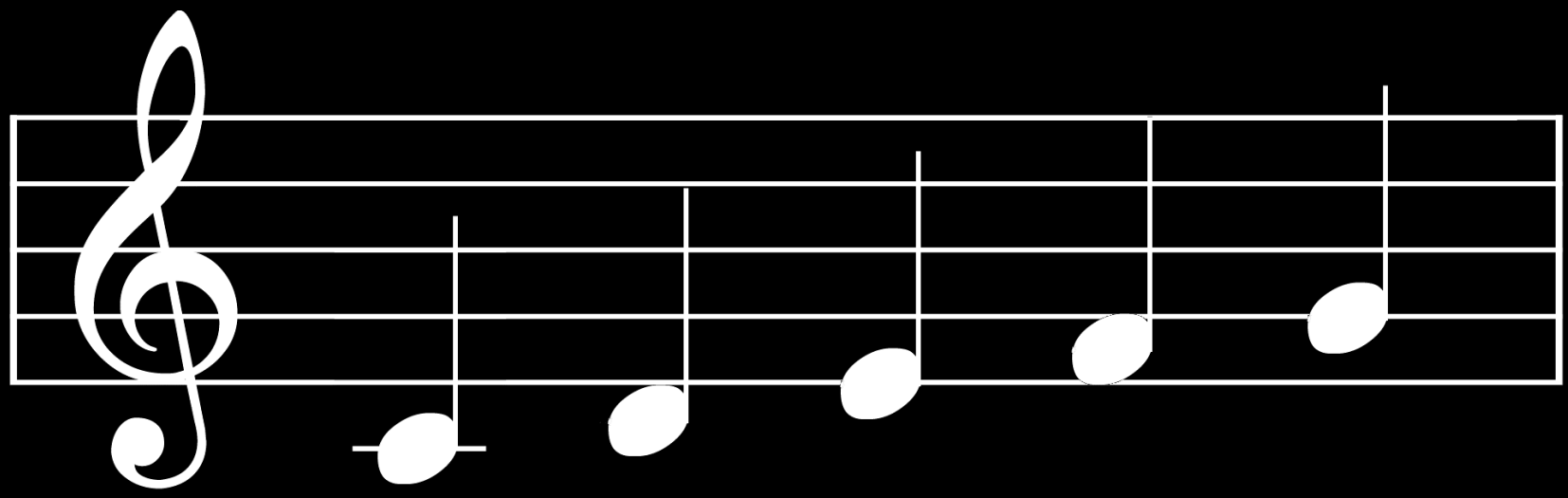
Solving Sophisticated Problems

Sophistication requires expertise

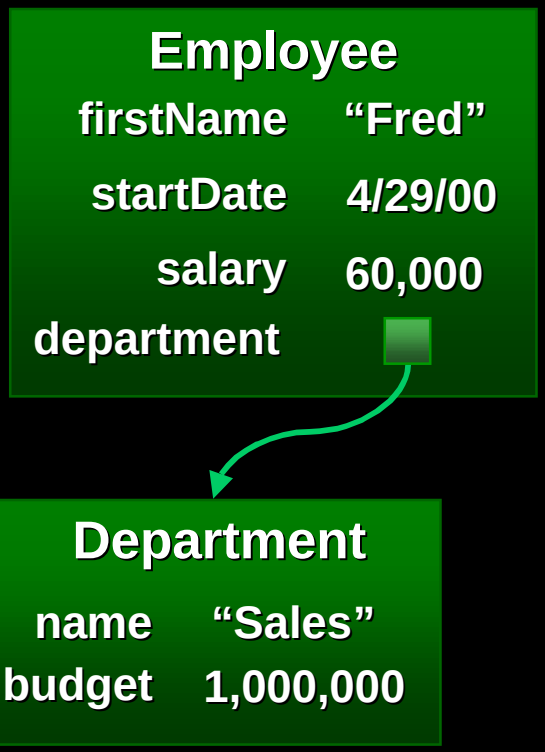


Fundamentals Are Key

Sophistication builds on fundamentals



From the Object Perspective



- Different classes of objects to model different types
- Each object stores data
- Each class of object has behavior—business logic

Object Persistence

Where do objects sleep at night?

- Store the data from objects when not in memory
- Archiving or serializing to a flat file works for small numbers of objects
- Need a high performance way of storing and retrieving large amounts of information
- Relational database seems a natural solution

Entities and Attributes

Employee

firstName	"Fred"
startDate	4/29/00
salary	60,000
department	

Employee

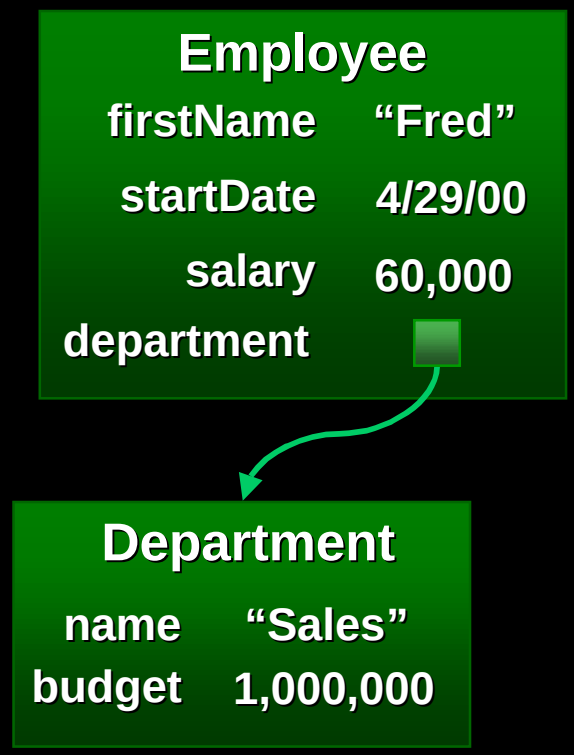
firstName	"Beth"
startDate	1/19/00
salary	65,000
department	

EMPLOYEE

EMP_ID	NAME	SALARY	ST_DATE	DEPT_ID
101	Fred	60,000	4/29/00	503
102	Beth	65,000	1/19/00	501

Relationship by Reference

A unique reference to another object



Relationship by Join

A unique primary key value in another table

EMPLOYEE

EMP_ID	NAME	SALARY	ST_DATE	DEPT_ID
101	Fred	60,000	4/29/00	503
102	Beth	65,000	1/19/00	501

DEPARTMENT

DEPT_ID	NAME	BUDGET
501	R&D	4,000,000
502	Sales	1,200,000

What are Enterprise Objects?

Affectionately known as EOs

Employee	
firstName	"Fred"
startDate	4/29/00
salary	60,000
department	

- Implement the EOEnterpriseObject interface
- Typically subclass EOGenericRecord
- Objects with built-in persistence

From Row to EO and Back

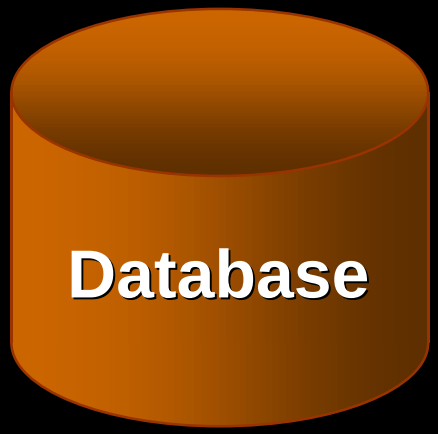
Employee

firstName	"Fred"
startDate	4/29/00
salary	60,000
department	

EMPLOYEE

EMP_ID	NAME	SALARY	ST_DATE	DEPT_ID
101	Fred	60,000	4/29/00	503

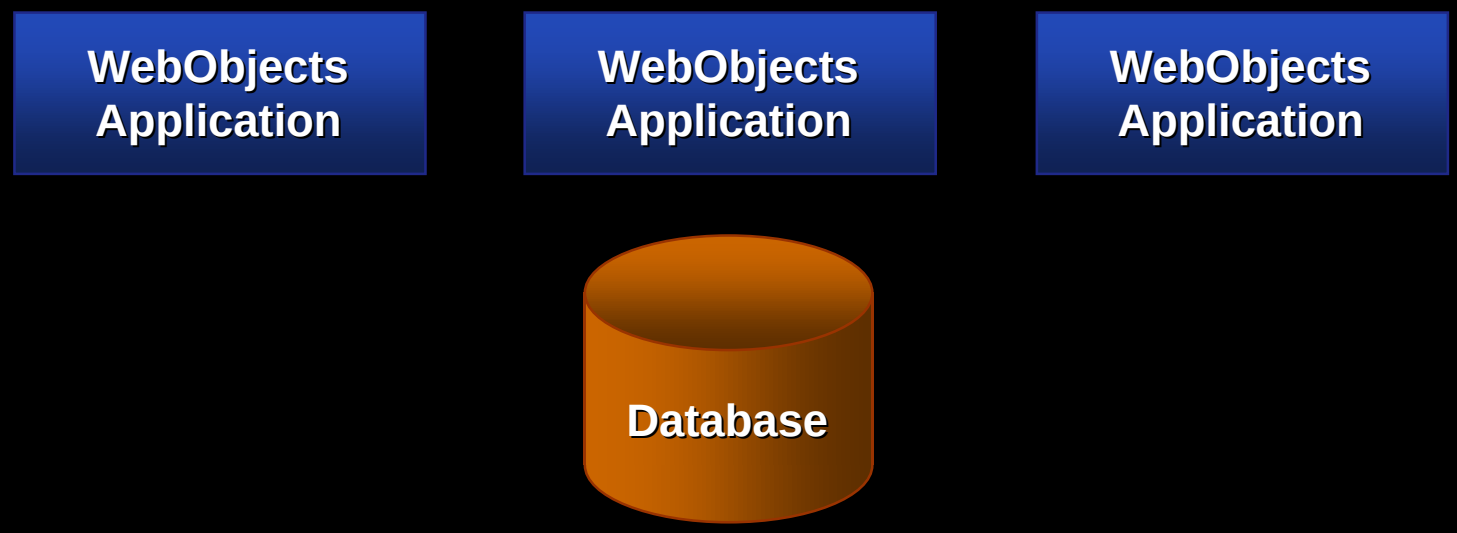
From the Database Perspective



- Data stored in database
- Logic can be executed in database
- EOF adds value to the power of a database

Distributed Processing

Off-load logic processing to application servers



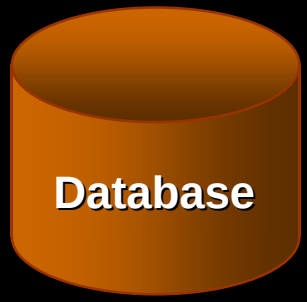
Logic Written in Standard Java

Object-oriented design in a widely used language

WebObjects Application

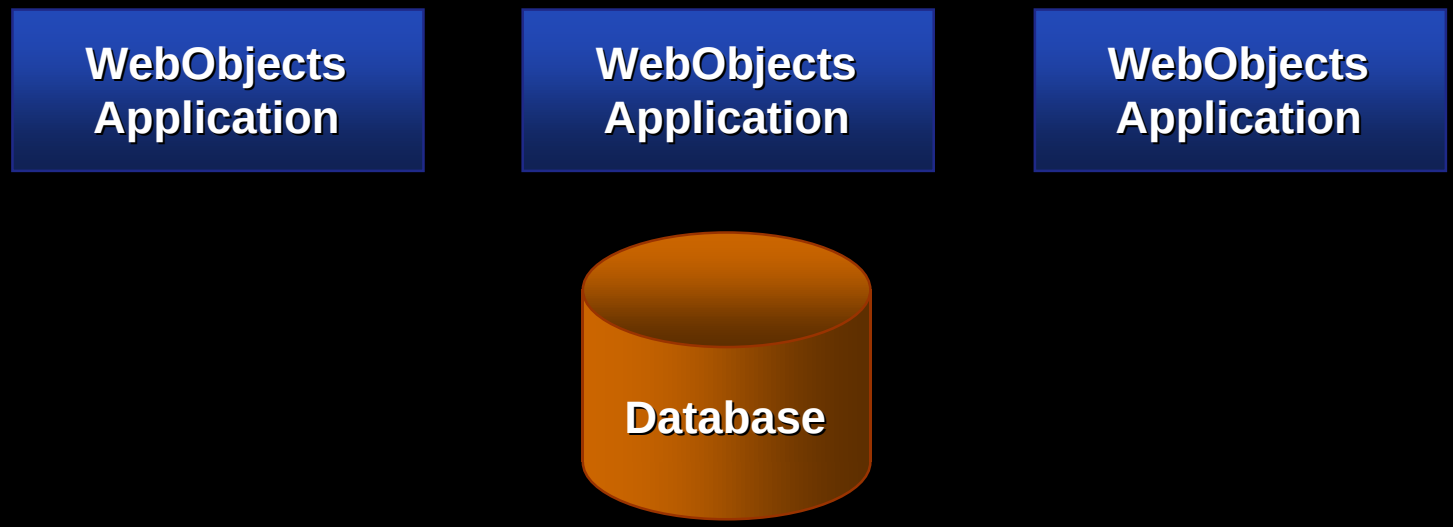
WebObjects Application

WebObjects Application



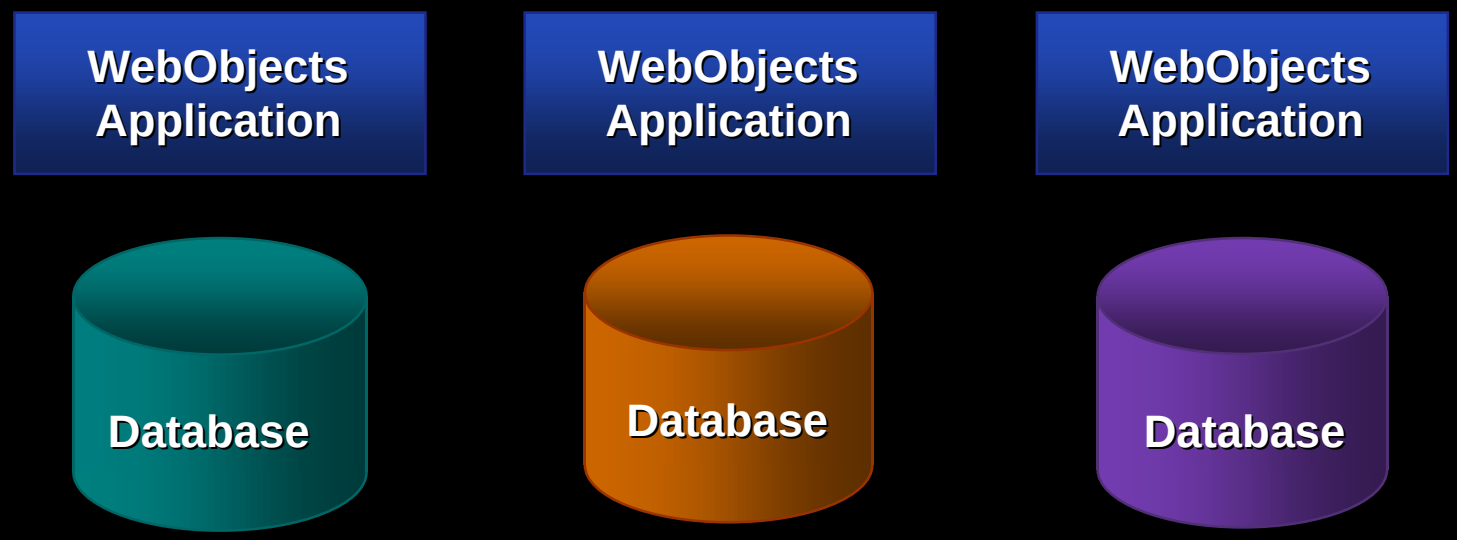
Dynamically Generated SQL

Transactions and statements generated by EOF



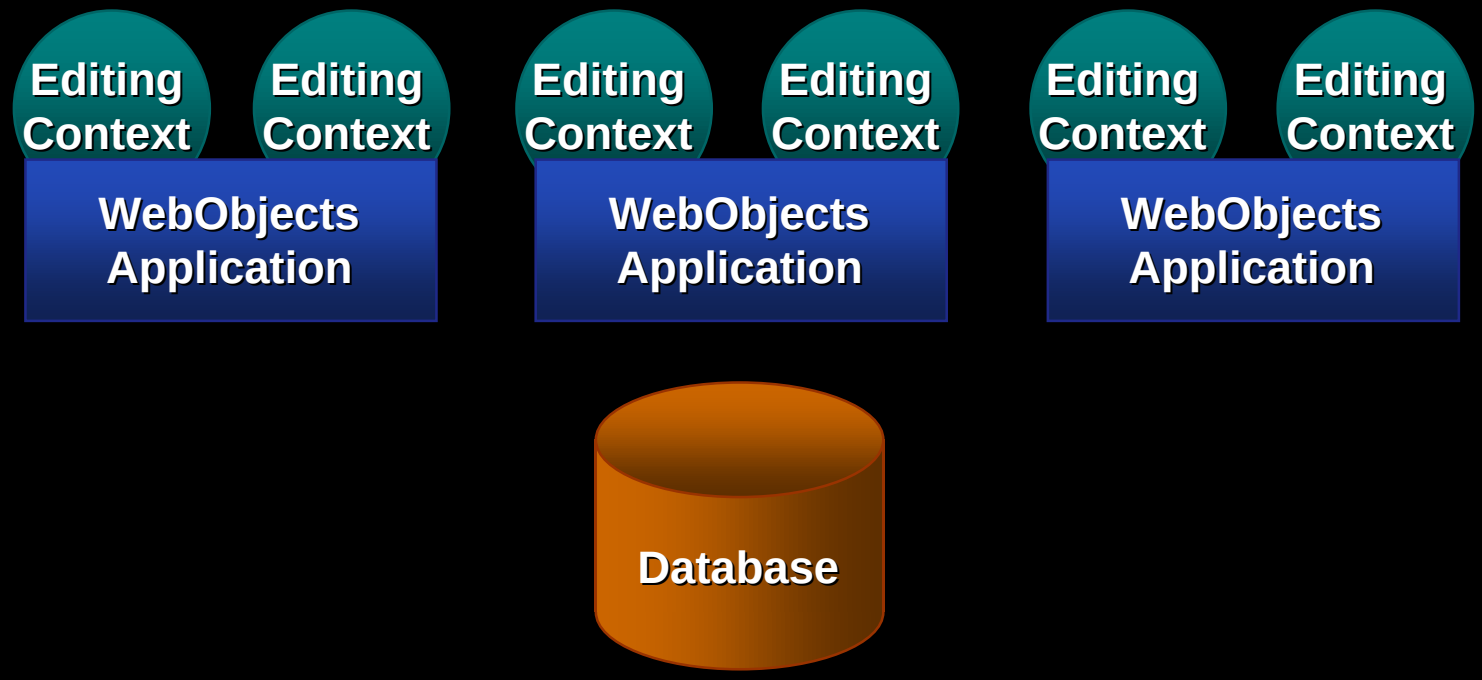
Multiple Data Sources

Using data from different sources abstracted at a low-level—programmatic interface remains the same



Separate ‘Scratch Pad’ Per User

Each user provided a separate context for making edits and canceling changes



EOEditingContext

The class you use most for programmatic control

- Fetches from the database
- Tracks updates to all EOs it has fetched
- Tracks inserts and deletes
- Stores edits until changes are saved or reverted

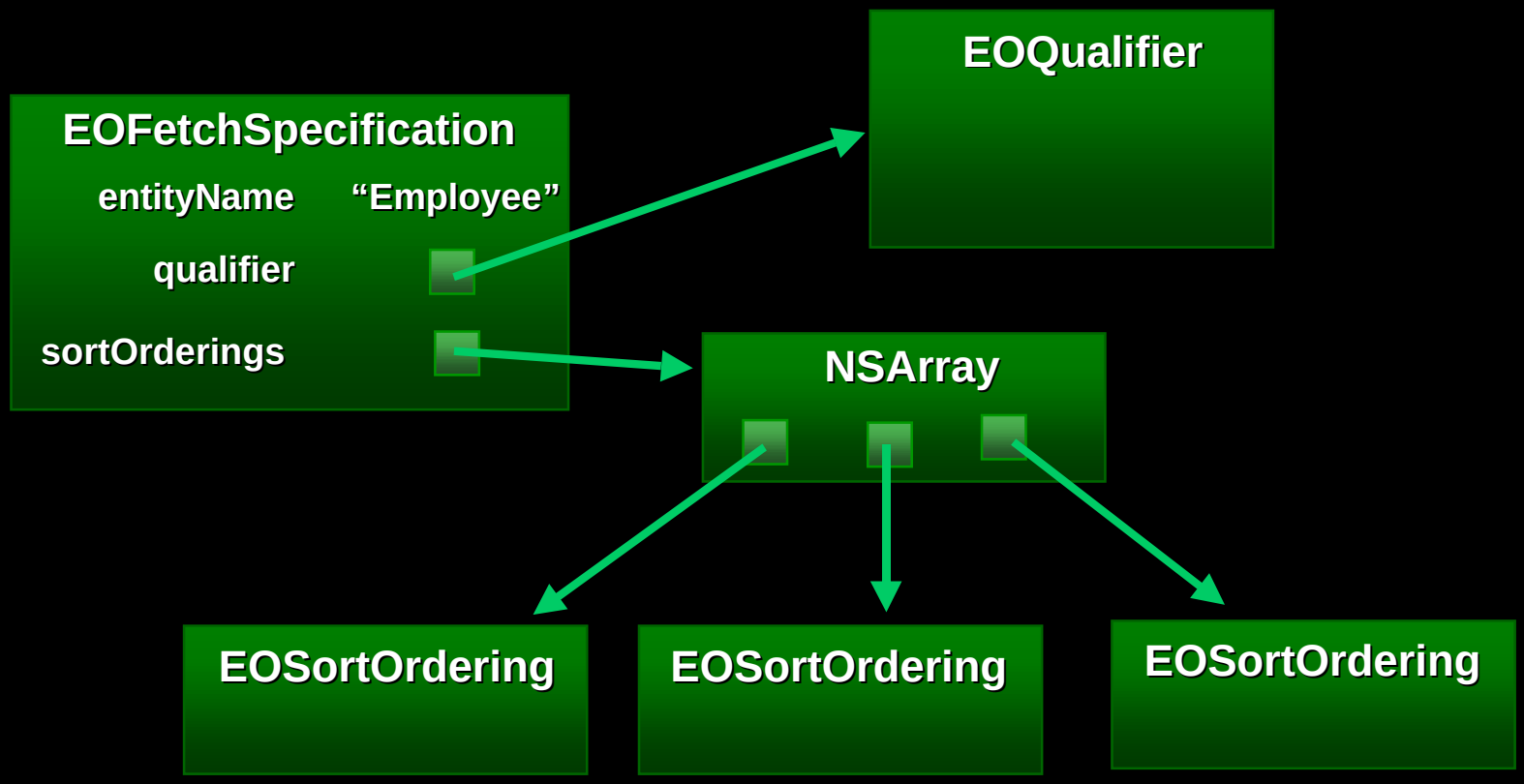
Fetching

Many techniques—all with same underlying steps

- Create a fetch specification
- Access an editing context
- Tell editing context to fetch using the specification
- Receive an array of retrieved Enterprise Objects

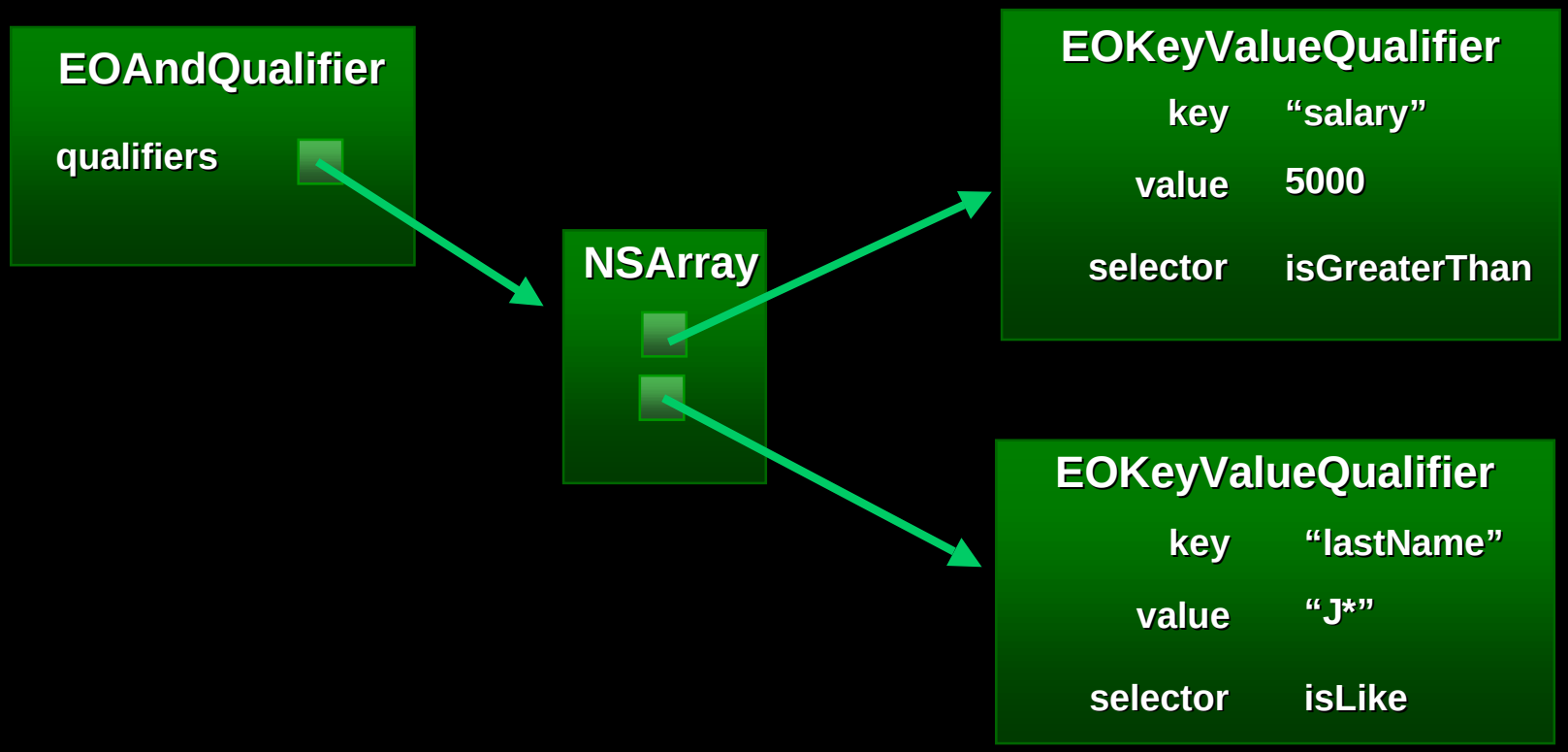
EOFetchSpecification

Describes what should be fetched from the database



EOQualifier

“salary > 5000 AND lastName is like J*”



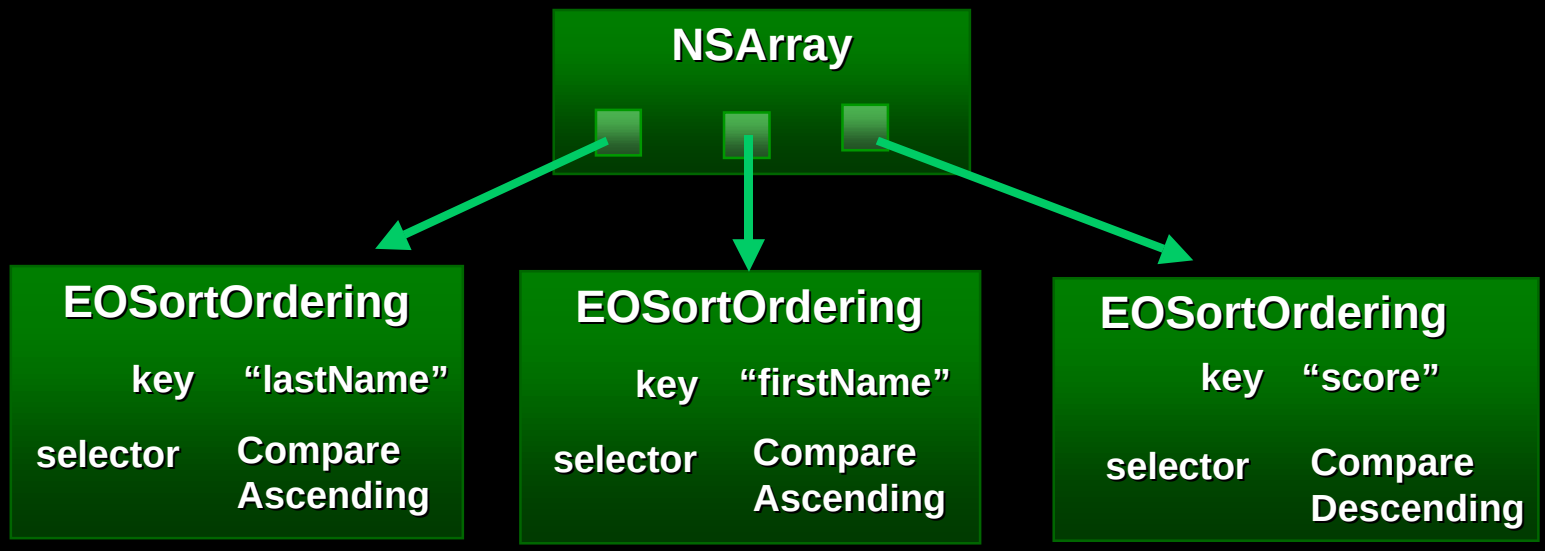
Creating Qualifiers

- Method takes a format string and an array of arguments

```
NSMutableArray args = new NSMutableArray();
args.addObject(new Integer(5000));
args.addObject("J*");

EOQualifier qualifier =
    EOQualifier.qualifierWithQualifiierFormat
    ("salary > %@ AND lastName like %@", args);
```

EOSortOrdering



lastName	firstName	score
Johan	Martin	95
Jones	Allan	90
Jones	Allan	85
Jones	David	87

Creating Sort Orderings

- Sort ordering selectors are static variables of the EOSortOrdering class

```
NSMutableArray orderings = new NSMutableArray();

EOSortOrdering ordering1 =
    new EOSortOrdering("lastName",
        EOSortOrdering.CompareAscending);

orderings.addObject(ordering1);
```

Building the Fetch Spec

- Only the entity name is required for an unqualified, unsorted fetch

```
// assume these have been created
NSMutableArray orderings;
EOQualifier qualifier;

EOFetchSpecification spec =
    new EOFetchSpecification
            ("Employee", qualifier, orderings);
```

Performing the Fetch

- Fetching returns an array of EOs

```
EOFetchSpecification spec;
NSArray results;

EOEditingContext ec =
    session().defaultEditingContext();

results = ec.objectsWithFetchSpecification(spec);
```

Creating and Inserting

- Two separate steps combined in one convenience method

```
EOEnterpriseObject eo;
EOEditingContext ec;

eo =
    EOUtilities.createAndInsertInstance
            (ec, “Employee”);
```

Editing

- Make changes using standard accessors—the editing context observes all changes

```
Employee employee;

employee.setName("Jerry Long");
```

- Key Value Coding provides generic accessors

```
employee.takeValueForKey("Jerry Long", "name");

employee.valueForKey("name");
```

Deleting

- Tell the editing context to delete the object. It will be deleted next time changes are saved

```
EOEnterpriseObject eo;
EOEditingContext ec;

ec.deleteObject(eo);
```

Saving and Reverting Changes

- Pending changes are not sent to the database until you tell editing context to save changes

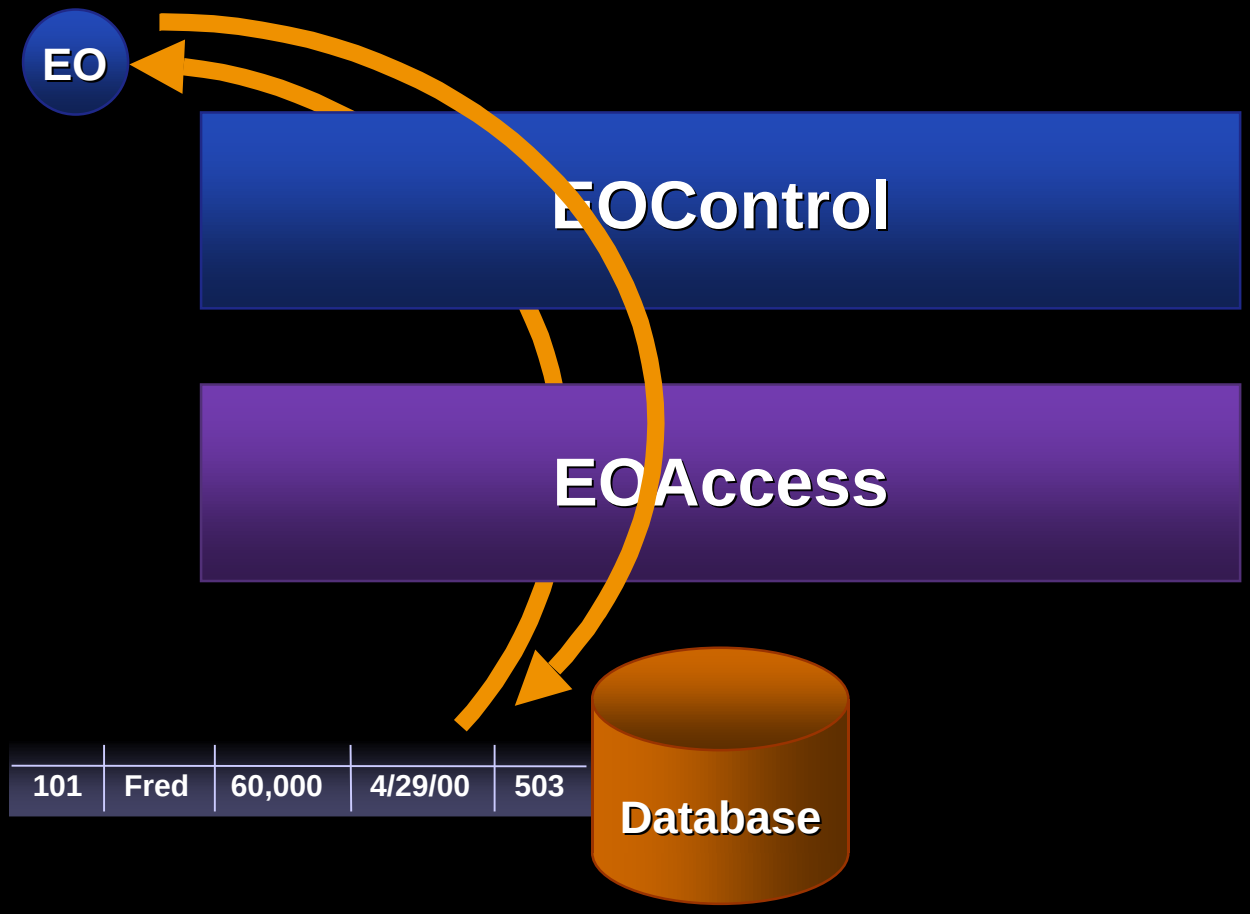
```
editingContext.saveChanges();
```

- Pending changes are discarded by telling the editing context to revert

```
editingContext.revert();
```

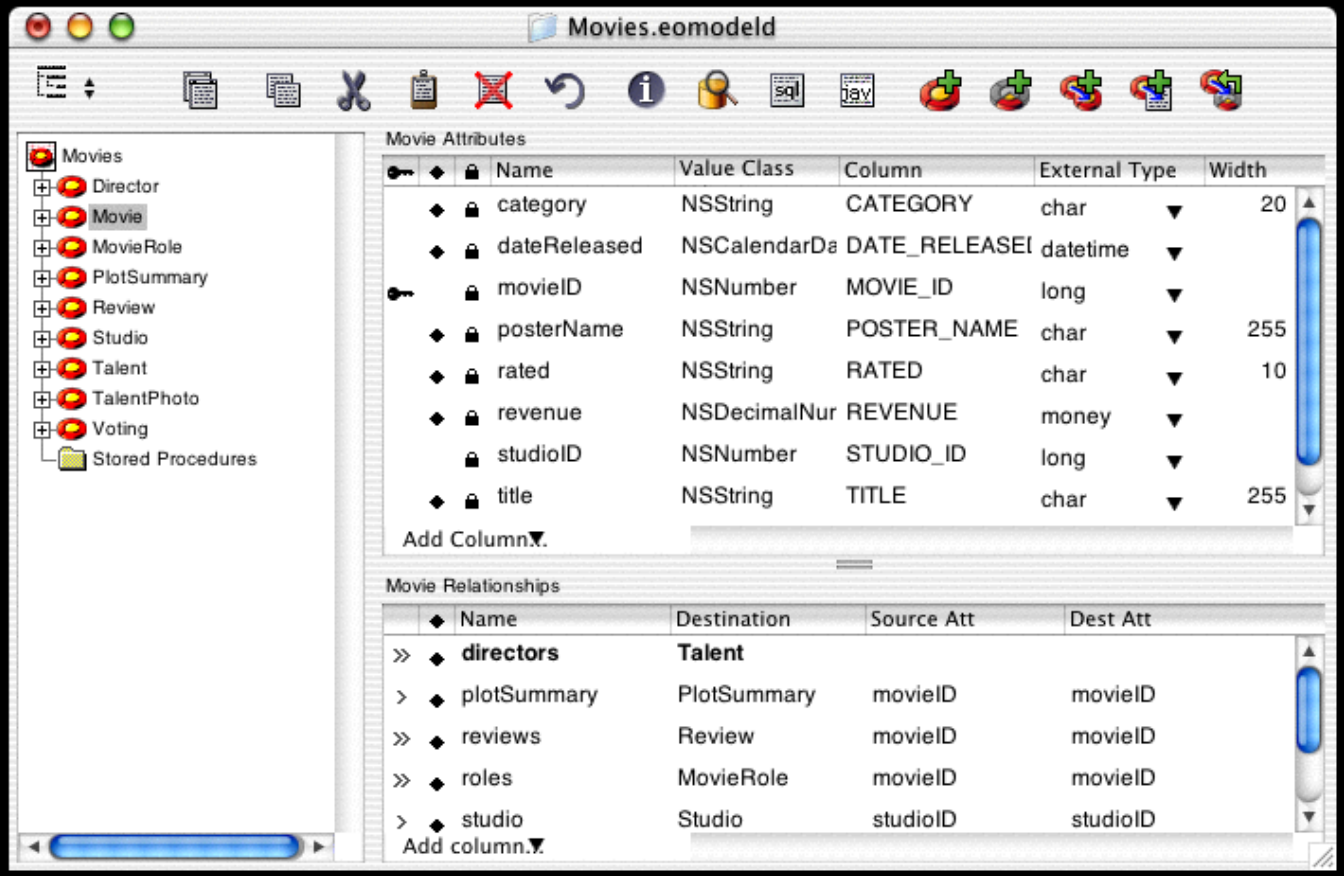
The EOF Stack

Who are the frameworks in your neighborhood?

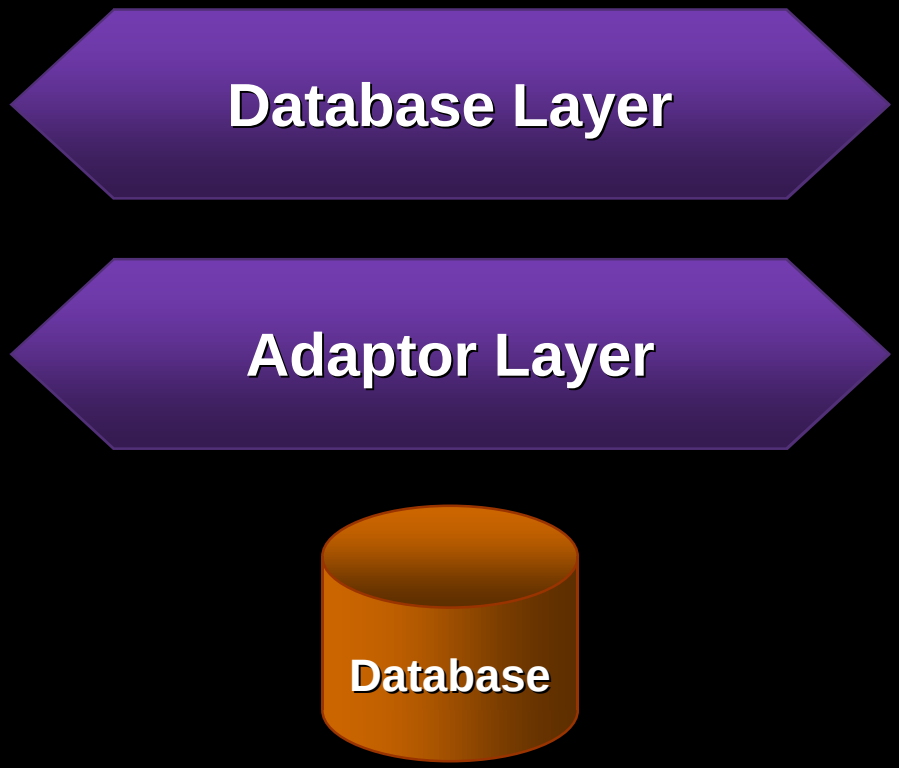


Model Configures EOAccess

Define object-relational mapping in EOModeler



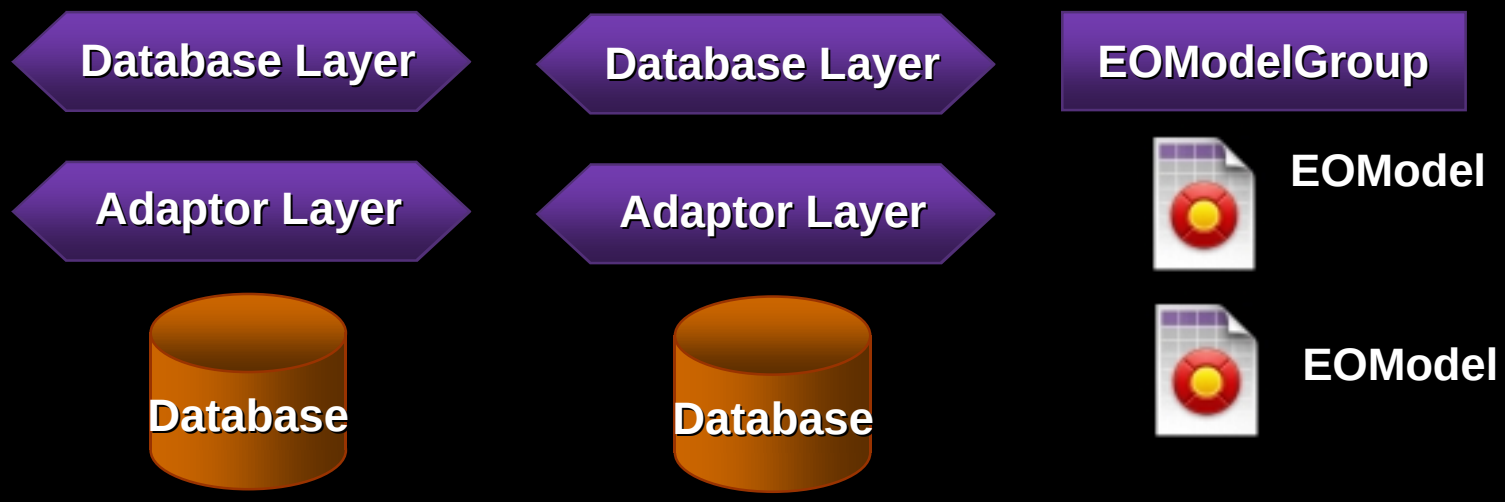
EOAccess Framework



EOModel

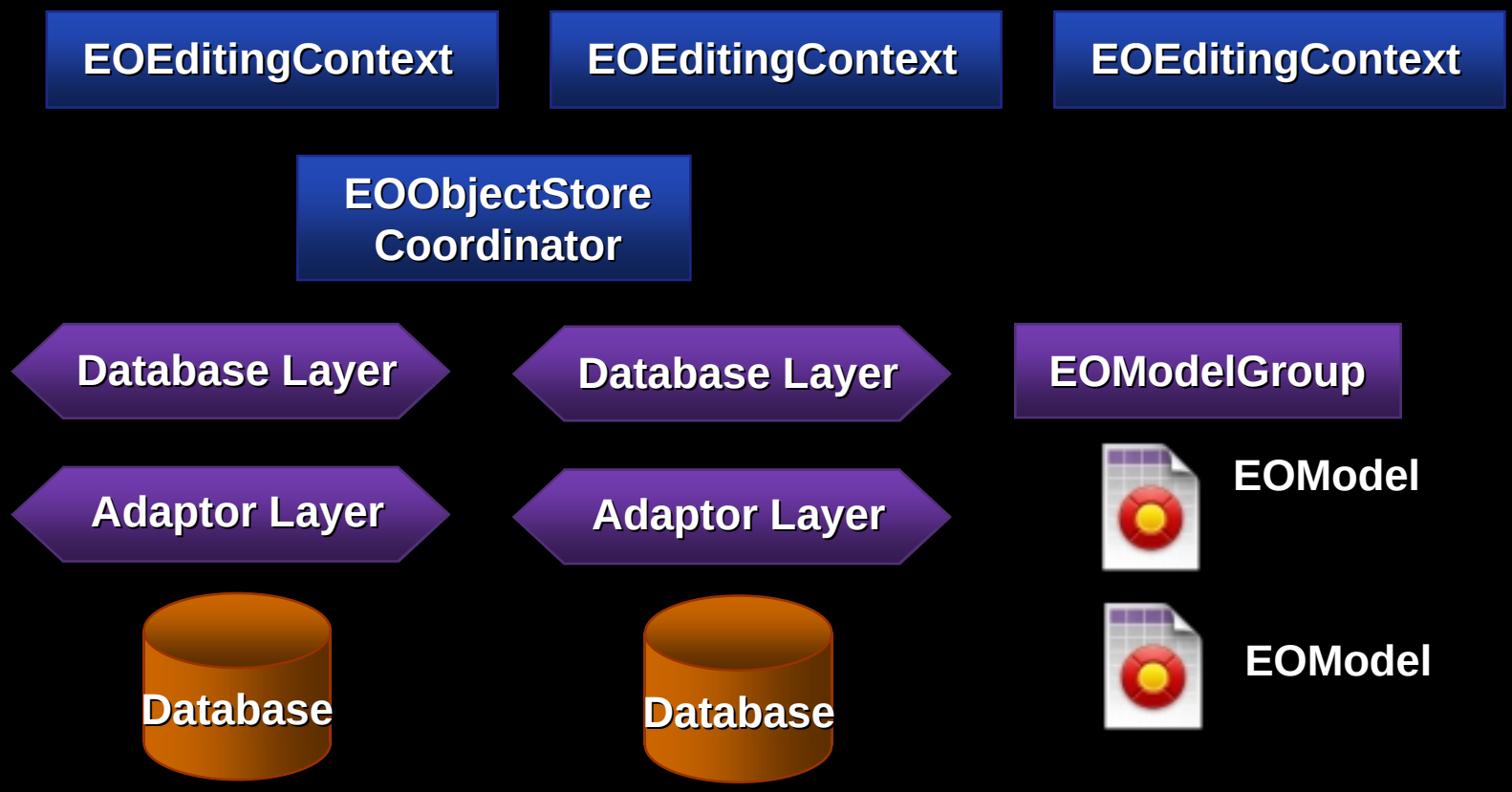
Multiple Data Sources

Multiple EOModels, one per data source

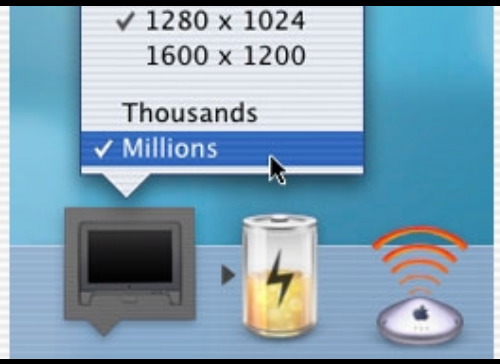


EOControl Framework

EOAccess coordination and programming control



Demo



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WebObjects Lab

- Located downstairs in Room K
- Lab hours
  - Monday 12:00–6:00
  - Tuesday 10:30–6:00
  - Wednesday 10:30–6:00
  - Thursday 10:30–6:00
  - Friday 10:30–3:30

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Roadmap

610 Introduction to Data Modeling & Connectivity	Room A1 **Thurs., 9:00am**
613 Advanced Enterprise Objects Framework	Room A1 **Thurs., 3:30pm**
Session FF111 Feedback Forum: WebObjects	Room A1 **Fri., 3:30pm**

Who to Contact

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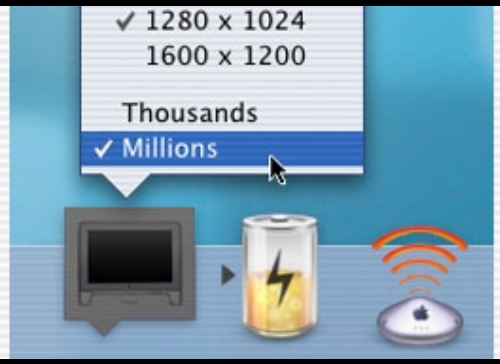
Q&A



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